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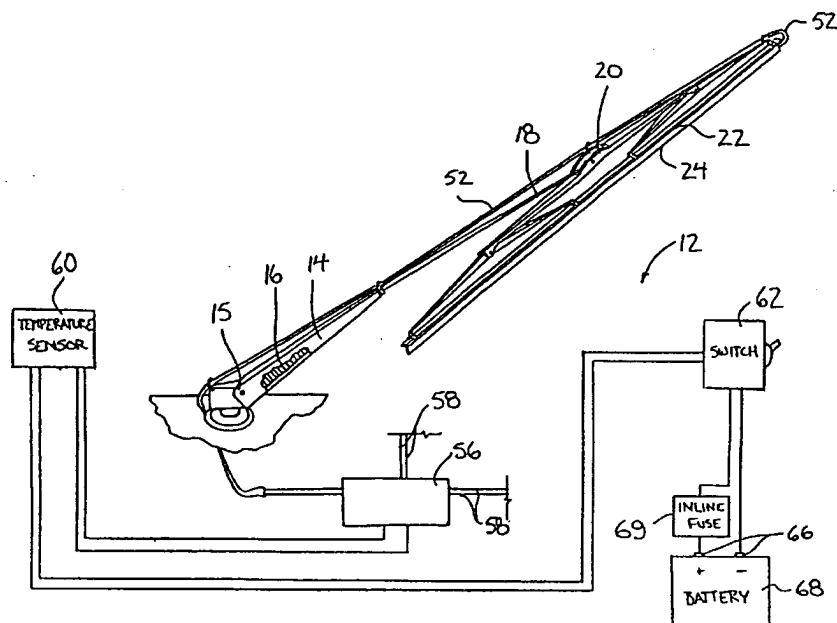
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(54) Title: HEATED WIPER ASSEMBLY



(57) Abrégé/Abstract:

A heated wiper blade assembly is provided for preventing the build up of ice on the wiper element. The wiper element is an elongate resilient member having a passage extending longitudinally therethrough from an opening at one end thereof. An elongate heater element is mounted in the passage for selective longitudinal sliding movement therein. The heater element is thus removable from the wiper element such that the wiper element may be replaced independently from the heater element.

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## HEATED WIPER ASSEMBLY

### FIELD OF THE INVENTION

This invention relates to a heated wiper assembly for use with windshield wiper blades.

### 5 BACKGROUND

In colder climates, the build up of ice on vehicle windshield wiper blades is a common problem. The ice causes the wiper blades to operate poorly which is an annoyance to drivers and can become a significant road hazard if the visibility of the driver through the windshield is significantly reduced.

10 Various wiper heating devices have attempted to overcome the problem of ice build up on wiper blades by mounting a heating element in close proximity to or directly in engagement with the wiper blades. In order for the heating element to operate effectively it is generally required that the heating element directly engage the wiper. Known heating devices however generally mount the  
15 heating element integrally within the wiper or wiper blade such that replacement of the wipers requires replacement of the heating element or portions thereof. The periodical replacement of the wipers can thus be expensive and requires time consuming assembly.

### SUMMARY

20 According to the present invention there is provided a wiper blade assembly having an elongate resilient wiper element with a mounting portion extending longitudinally along an inner side of the wiper element and a wiping portion extending longitudinally along an outer side of the wiper element, wherein the improvement comprises:

25 a passage extending longitudinally through the wiper element spaced between the inner and outer sides thereof from an opening located at one end of the

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wiper element;

an elongate heating element mounted within the passage of the wiper element for selective longitudinal sliding movement therein such that the heating element is selectively separable from the wiper element through the opening at the  
5 end thereof;

electrical supply means coupled to one end of the elongate heating element for heating the heating element upon activation of the electrical supply means; and

control means for controlling activation of the electrical supply means.

10 The mounting of the heating element so as to be slidably removed from the wiper element allows the wiper element or the entire wiper blade to be replaced independently of the heating element. This reduces the cost of replacement as the heating element may be reused with a new wiper element. Furthermore, the heating element does not require disconnection and subsequent  
15 reconnection when the wiper element is replaced which saves time when replacing the wiper element of one or both wipers of a conventional vehicle.

The heating element preferably comprise a sealed member having a longitudinally extending wire of conductive material therein. The sealed arrangement of the heating element protects the conductive material therein from  
20 the weather.

The sealed member may comprise a pair of longitudinally extending channels which are separated by insulating material wherein the wire of conductive material extends through both channels such that respective free ends of the wire are both located at one end of the sealed member for connecting to the electrical  
25 supply means. This allows the electrical supply means to be connected only at one end of the heating element such that the electrical supply means do not require

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disconnection in order to remove the heating element from the wiper element.

The wiper element is preferably formed of resilient material such that the wiper element is resiliently deformed about the heating element for selectively securing the heating element therein. The resilient deformation of the wiper element about the heating element snugly secures the heating element therein without requiring additional mounting means to secure the heating element in the wiper element.

The wiper element preferably includes a longitudinally extending tubular portion having the passage extending axially therethrough and the wiping portion comprises at least one resilient flange extending radially outward therefrom. The flange defines a lip similar to conventional wiper elements for engaging the windshield while being positioned as close as possible to the heating element.

The heating element and the passage are preferably both circular in cross section for securely engaging the heating element within the passage. The matching cross sectional shape of the heating element and the passage ensure that the wiper element evenly engages all side of the heating element for securing the heating element therein without requiring additional mounting means.

The control means may include temperature override means for deactivating the electrical supply means in response to a temperature which exceeds a recommended temperature. This prevents the wiper element from being heated unnecessarily. The temperature override means preferably comprises a thermostatic sensor having mounting means for mounting the sensor remotely from the heating element. The temperature override means are thus positioned to effectively sense the ambient temperature.

There may be provided a battery coupling for coupling the electrical supply means to a battery of a vehicle mounting the wiper assembly thereon. The

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assembly thus does not require its own electrical power supply separate from that of the vehicle.

The control means preferably includes a switch interrupting electrical supply means having mounting means for mounting the switch remotely from the wiper blade assembly. The heating element can thus be deactivated by an operator  
5 of the vehicle as desired by mounting the switch within an interior space of the vehicle.

The electrical supply means may include a plurality of heater element couplings for coupling the control means to a plurality of wiper blade assemblies  
10 having respective heater elements associated therewith. A vehicle thus only requires a single control means even if the vehicle includes multiple wiper blade assemblies such as a pair of blades on a front windshield or an additional blade on a rear windshield of the vehicle.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15 In the accompanying drawings, which illustrate an exemplary embodiment of the present invention:

Figure 1 is an isometric view of one wiper blade according to the present invention with the power supply shown schematically.

Figure 2 is a partly sectional, isometric view of the wiper of Figure 1.

20 Figure 3 is a sectional view of the heating element along line 3-3 of Figure 2 showing the heating element removed from the wiper.

#### DETAILED DESCRIPTION

Referring to the accompanying drawings there is illustrated a wiper assembly generally indicated by reference numeral 10 having a wiper heating  
25 assembly 12 mounted thereon. The wiper heating assembly 12 is arranged to heat

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the wiper blade assembly 10 so as to prevent the build up of ice thereon when in use in colder climates.

5 The wiper blade assembly 10 includes an arm 14 which is pivotally mounted at its base 15 as in a conventional vehicle wiper blade assembly. A tension spring 16 is mounted at the base 15 of the arm so as to bias the arm against the windshield of a vehicle having the assembly mounted thereon. An articulation joint is mounted at a free end 18 of the arm for pivotally mounting a wiper blade 20 thereon. The wiper blade 20 includes a longitudinally extending wiper receiving channel 22 for mounting a wiper element 24 therein.

10 The wiper heating assembly 12 includes the wiper element 24 in the form of an elongate resilient member. The wiper element 24 includes a mounting portion 26 extending longitudinally along an inner side of the element. The mounting portion is a T shaped flange similar to conventional wiper elements for mounting the wiper element within the channel 22 of the wiper blade. The wiper element 24  
15 further includes a tubular portion 28 extending longitudinally along the portion 26.

A wiping portion 30 extends longitudinally along an outer side of the wiper element for engaging the vehicle windshield. The wiping portion includes a primary lip 32 in the form of a radially extending flange as well as a pair of shorter secondary lips 34 located on each side of the primary lip 32 and extending radially  
20 outward from the tubular portion as well.

An axially extending passage 36 extends through the tubular portion of the wiper element between openings 38 located at respective ends of the wiper element. The passage 36 is spaced between the respective inner and outer sides of the wiper element.

25 A heating element 40 is slidably mounted within the passage 36. The heating element 40 comprises a tubular member of flexible plastic having a

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longitudinally extending insulated plastic divider 42 mounted therein defining a pair of wire receiving channels 44 extending longitudinally through the heating element. A conductive heating wire 46 is mounted within the channels 44 in a U shaped pattern such that a portion of the wire extends longitudinally through each channel.

- 5 The longitudinally extending portions of wire 46 are coupled together at a wrapped end 48 and define a pair of free ends 50 opposite the wrapped end. The tubular plastic member of the heating element protects the conductive heating wire therein from the elements. The conductive heating wire has an appropriate resistance so as to dispense heat therefrom when electricity is passed therethrough.

- 10 A pair of insulated electrical supply leads 52 are coupled to the free ends 50 of the conductive wire to provide an electrical current therethrough. A sealed resilient sleeve 54 is wrapped about an end of the heating element 40 having the free ends 50 of the conducting wire therein and extends over the electrical supply leads 52 so as to seal the wires therein and protect them from the elements.

- 15 A coupling 56 is provided on the pair of electrical supply leads 52 so as to provide a junction for auxiliary leads 58 for coupling numerous heating elements associated with numerous wiper blades thereon.

- A thermostatic sensor 60 interrupts the electrical supply leads 52 upon sensing a temperature which exceeds a recommended operating temperature.
- 20 Upon sensing the excessive temperature the electrical supply leads are interrupted such that current no longer passes through the heating element such that heat is no longer dissipated therefrom. The thermostatic sensor 60 includes a mount for mounting the sensor on a hood of the vehicle remotely from the wipers for sensing the ambient temperature.

- 25 A control switch 62 is also provided for selectively interrupting the electrical supply leads 52 so as to activate and deactivate the heating element with
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the switch. The control switch 62 includes a mount for mounting the switch in an interior space of the vehicle within reach of an operator of the vehicle such that the control switch is located remotely from the wiper assembly.

A battery coupling 66 is arranged to couple the electrical supply leads  
5 52 to a battery 68 of a conventional vehicle or to the power supply of an auxiliary electrical component of the vehicle. A positive lead of the battery coupling 66 includes an inline fuse 69 mounted in series therewith to protect the electrical components of the assembly.

The resilient material of the wiper element 24 is arranged to deform  
10 about the heating element 40 when the heating element is slidably mounted therein so as to secure the heating element therein by snugly engaging respective sides of the element. Both the heating element 40 and the passage 36 have a circular cross section so as to snugly receive the heating element within the passage without requiring additional mounting means to secure the heating element therein.

The resilient nature of the wiper element 24 allows the heating element  
15 40 to remain selectively slidable in a longitudinal direction within the passage 36 so as to be selectively separable from the wiper element by sliding the heating element through one of the elements 38 located at respective ends of the passage. In this arrangement, the wiper blade 20 or the wiper element 24 by itself can be replaced  
20 without replacing the heating element 40.

In order to replace the wiper element 24, should the wiper element  
become damaged, the heating element 40 is first slidably removed therefrom. The wiper element 24 may then be replaced or the entire wiper blade 20 may be replaced such that the heating element 40 may be subsequently slidably received  
25 within the passage 36 of the replacement wiper element. Due to the required periodic maintenance and replacement of wiper elements, the use of the wiper blade



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assembly and wiper heating assembly of the present invention provides a significant savings in cost and time as the heating element 40 does not require replacement or reconnecting once it has been initially installed.

While one embodiment of the present invention has been described in  
5 the foregoing, it is to be understood that other embodiments are possible within the scope of the invention. The invention is to be considered limited solely by the scope of the appended claims.

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## CLAIMS:

1. In a wiper blade assembly having an elongate resilient wiper element with a mounting portion extending longitudinally along an inner side of the wiper element and a wiping portion extending longitudinally along an outer side of the wiper element, wherein the improvement comprises:

a passage extending longitudinally through the wiper element spaced between the inner and outer sides thereof from an opening located at one end of the wiper element;

an elongate heating element mounted within the passage of the wiper element for selective longitudinal sliding movement therein such that the heating element is selectively separable from the wiper element through the opening at the end thereof;

electrical supply means coupled to one end of the elongate heating element for heating the heating element upon activation of the electrical supply means; and

control means for controlling activation of the electrical supply means.

2. The assembly according to claim 1 wherein the heating element comprises a sealed member having a longitudinally extending wire of conductive material therein.

3. The assembly according to Claim 2 wherein the sealed member comprises a pair of longitudinally extending channels which are separated by insulating material wherein the wire of conductive material extends through both channels such that respective free ends of the wire are both located at one end of the sealed member for connecting to the electrical supply means.

4. The assembly according to Claim 1 wherein the wiper element is formed of resilient material such that the wiper element is resiliently deformed

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about the heating element for selectively securing the heating element therein.

5        5.     The assembly according to Claim 1 wherein the wiper element includes a longitudinally extending tubular portion having the passage extending axially therethrough and the wiping portion comprises at least one resilient flange extending radially outward therefrom.

6.     The assembly according to Claim 1 wherein the heating element and the passage are both circular in cross section for securely engaging the heating element within the passage.

10       7.     The assembly according to Claim 1 wherein the control means includes temperature override means for deactivating the electrical supply means in response to a temperature which exceeds a recommended temperature.

8.     The assembly according to Claim 7 wherein the temperature override means comprises a thermostatic sensor having mounting means for mounting the sensor remotely from the heating element.

15       9.     The assembly according to Claim 1 wherein there is provided a battery coupling for coupling the electrical supply means to a battery of a vehicle mounting the wiper assembly thereon.

20       10.    The assembly according to Claim 1 wherein the control means includes a switch interrupting electrical supply means having mounting means for mounting the switch remotely from the wiper blade assembly.

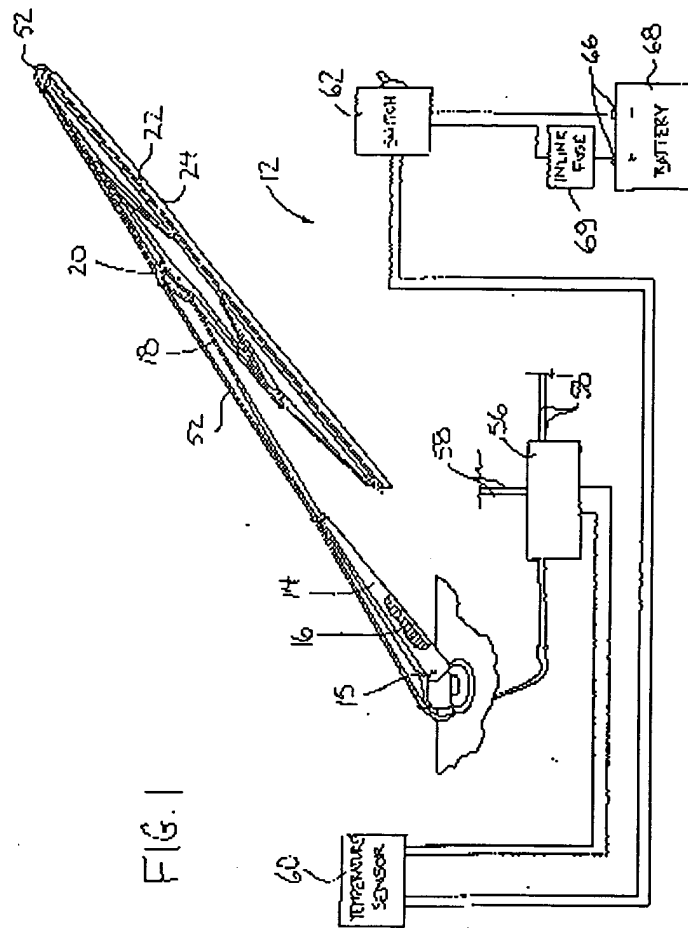
11.    The assembly according to Claim 1 wherein the electrical supply means includes a plurality of heater element couplings for coupling the control means to a plurality of wiper blade assemblies having respective heater elements associated therewith.

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ABSTRACT

A heated wiper blade assembly is provided for preventing the build up of ice on the wiper element. The wiper element is an elongate resilient member having a passage extending longitudinally therethrough from an opening at one end thereof. An elongate heater element is mounted in the passage for selective longitudinal sliding movement therein. The heater element is thus removable from the wiper element such that the wiper element may be replaced independently from the heater element.

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FIG. 2.

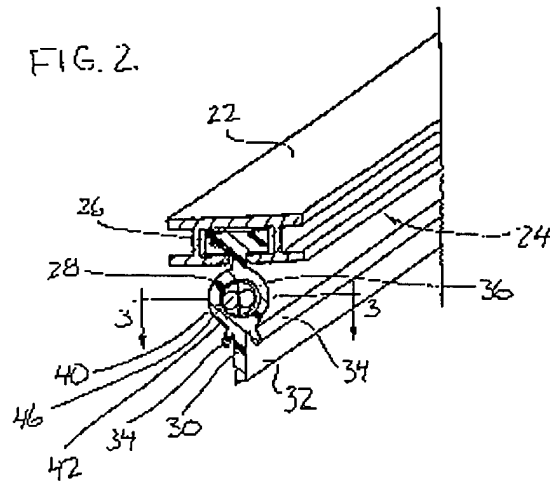
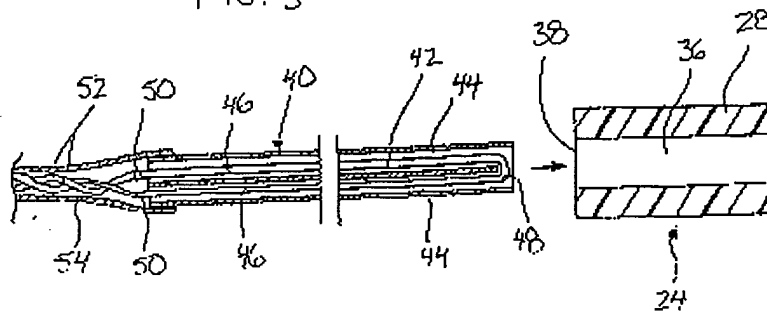


FIG. 3



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